1. Transcription (definition, where it takes place)

2. Differences in transcription in prokaryotes and eukaryotes

3. Phases of transcription; initiation

4. Phases of transcription; elongation and termination

5. RNA polymerase enzyme

6. Processing of the primary transcript - processing of the 3' end

7. Processing of the primary transcript - processing of the 5' end

8. Processing of the primary transcript - RNA splicing

9. The gene segment that started transcription has the following nucleotide sequence 3`…ATACCGAGTTGGACTG…5`. Determine the sequence of bases on the mRNA strand and label the 3' and 5' ends of the newly synthesized mRNA strand.

10. Based on the following strand of the mRNA molecule AUGAUUCUCCUUCUUUACAGGCGGCAUACCUGA write the sequence of nucleotides on the DNA matrix strand.

11. The gene segment that started transcription has the following nucleotide sequence 3'...AATCACGATCCTTCTAGGAGG...5'. Determine the order of the bases on the mRNA strand.

12. The segment of DNA being transcribed contains nucleotides in the arrangement ATCATTCCGATTCGGCCATT. Determine the order of nucleotides on the transcribed strand of mRNA.

1. Translation (definition, where it takes place)

2. Activation and binding of tRNA to amino acid

3. Phases of translation; initiation

4. Phases of translation; elongation

5. Termination of translation

6. Polyribosomes

7. Based on the following chain of the mRNA molecule AUGAUUCUCCCUUCUUUACAGGCGGCAUACCUGA, write the order of the tRNA anticodon.

8. The DNA sequence of one gene is as follows: TAC-CAG-AAA-AAT-AGG-ATT. Bearing in mind the meaning of the mentioned anticodons: UAC- methionine, CAG- valine, AAA- phenylalanine, AAU- leucine, AGG- serine, UGG- threonine and stop codon- UAA, write the sequence of amino acids of the polypeptide encoded by the given gene.

9. The peptide segment has the following composition: glycine - alanine - valine - lysine - valine - leucine. If the codons of these amino acids are known to be glycine (CGC), alanine (GCA), valine (GUC), lysine (AAA) and leucine (UUA), determine the sequence of the corresponding DNA and mRNA segments.

10. The DNA sequence of one gene is as follows: TAC-CCA-TGA -GCA-ATT. Bearing in mind the meaning of the mentioned anticodons: UAC-methionine, CCA-glycine, UGA-threonine, GCA-arginine, GAA-leucine and UAA-stop codon, write the sequence of amino acids of the polypeptide encoded by the given gene.

1. Epigenetic regulation of gene expression

2. Pre-transcriptional level of gene regulation; chromatin decondensation

3. Pre-transcriptional level of gene regulation; gene amplification and DNA rearrangement

4. DNA methylation

5. Phenomena involving methylation as a mechanism of gene activation

6. Genomic imprinting-definition, example of a syndrome

7. Gene and chromosomal imprinting

8. Transcriptional level of gene activity regulation - promoter, enhancer, silencer, proximal sequences

9. Regulatory proteins, hormones as transcription regulators

10. Post-transcriptional regulation of gene activity

11. Regulation of translation

12. Post-translational regulation

13. Activation of primary insulin translation